

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 7.—“Some Physical Properties of Nitric Acid Solutions.” By V. H. Veley, F.R.S., and J. J. Manley, Daubeny Curator, Magdalen College, Oxford.

In continuation of their former investigations, the authors have studied the densities with especial reference to the contractions per unit mass, and also the refractive indices. The various experimental and instrumental errors are fully discussed, as also the several effects likely to be produced by the various substances with which the acid solutions of necessity came into contact. The results obtained for the physical properties are given in series of tables and compared with those calculated from various equations for straight lines; these show that the physical properties are discontinuous at points corresponding very approximately to the concentrations required for simple molecular combinations only of nitric acid and water. In the case of the contractions the best defined points of discontinuity correspond to the composition of the hydrates with 14, 7, 4, 3, 1.5 and 1 molecular proportions of water; in the case of the refractive indices, the most marked points correspond to the 14, 7 and 1.5 hydrates; a remarkable discontinuity at 95–100 per cent. concentration was also observed. These points of discontinuity, though to some degree, yet to another degree are ideal in that within the limits of 1 to 2 per cent. in the vicinity of such points there is a transition stage.

The values for μ are further expressed in terms both of Gladstone and Dale's and of Lorentz's formula, and it is shown that the values in neither case are constant, but decrease with increase of concentrations.

Anthropological Institute, March 12.—Prof. Haddon, F.R.S., in the chair.—Prof. Victor Horsley exhibited some trephined skulls from New Britain, and read a communication by Rev. J. A. Crump describing the methods employed by the natives and the objects aimed at. The operator is the medicine-man of the tribe, and he employs a flake of obsidian or piece of shell; with this he scrapes the exposed bone until a piece the size of half-a-crown is removed. As a rule the operation is resorted to in cases of fracture, and the mortality is about 80 per cent. In New Ireland, however, some forms of insanity, and even headache, are treated in the same way, and there are cases in which people have undergone the operation five times at various periods.—Mr. J. Gray read a paper on cephalometric instruments and cephalograms. An instrument was shown for taking head measurements, which was devised for field work and required no delicate adjustments. Two other instruments for obtaining diagrams of the contour of the head were also described, and head contours taken by them shown on the screen.—Prof. H. Louis described the “kingfisher” type of Malay kris, the handle of which resembles a kingfisher's head and beak; according to the Malay legend they were made in memory of a chief named Kingfisher, who invaded the peninsula from the Bugis Islands many centuries ago.

Zoological Society, March 19.—Dr. Henry Woodward, F.R.S., vice-president, in the chair.—Mr. Sclater exhibited and made remarks on some specimens of mammals from the Protectorate of Uganda recently received from Sir Harry Johnston, K.C.B. Amongst them were a skin and bones of a chimpanzee, which, so far as was known, was the only complete specimen of this ape that had reached this country from Eastern Africa. Other interesting objects in the collection were flat skins of two apparently new antelopes of the genera *Cobus* and *Cephalophus*. Mr. Sclater also laid upon the table a small case of Lepidoptera collected in St. Lucia, West Indies, by Major A. H. Cowie, R.E.—Mr. Tegetmeier exhibited a very fine head of the sable antelope (*Hippotragus niger*) from Barotseland.—A communication was read from Dr. G. Stewardson Brady which contained descriptions of a collection of Ostracoda belonging to the Zoological Museum of Copenhagen, most of the species represented in it being new to science. The collection was very varied in character, embracing examples of both marine and freshwater species from widely different localities.—Dr. C. I. Forsyth Major read a paper on *Lemur mongoz* and *Lemur rubriventer*, in which he pointed out that the species of Lemur which was generally called *Lemur mongoz* had absolutely nothing to do with the Linnean species of that name, which had been based on the description and figure of Edwards in his “Gleanings.” The only ascertained localities in which the true *Lemur mongoz*, L., occurred were the neighbourhood of the Bembatoka Bay (N.W. coast of Madagascar) and the two

islands Anjuan and Mohilla of the Comoro group. The earliest available name for the usually so-called *Lemur mongoz*—a very variable species, spread over a great part of Madagascar—seemed to be *Lemur fuscus*, E. Geoffr. The two species, as indeed were all the species of the genus, were easily distinguishable by the characters of their skulls.—Dr. Forsyth Major also showed that *Lemur rubriventer*, I. Geoffr. (of which *Prosimia rufipes*, Gray, was a synonym), was not, as had been supposed, the female form of *L. nigerrimus*, Scl., but a very well-marked species. A peculiar feature of the skull was a huge pneumatic cavity in the palatal, which invaded the whole bottom of the orbit.—A communication was read from Mr. P. Cameron containing an account of the Hymenoptera collected in New Britain by Dr. Arthur Willey. Owing to the fact of the locality having been but little explored previously, most of the specimens represented in the collection belonged to new species.—Mr. G. A. Boulenger, F.R.S., described four new species of freshwater fishes discovered by Mr. F. W. Styan, at Ningpo, China.—Mr. F. E. Beddard, F.R.S., read a note upon Garnett's Galago (*Galago garnetti*), in which he pointed out that a spiny structure, nearly similar to that previously described on the wrist of *Hapallemur griseus*, was also present on the hind foot of this animal.

Mineralogical Society, March 19.—Prof. A. H. Church, F.R.S., president, in the chair.—Mr. H. L. Bowman read a paper on the micas, tourmaline and associated minerals occurring in pegmatite at Haddam Neck, Connecticut. The occurrence resembles that at Auburn, Maine. A peculiar pink fibrous mineral surrounding prisms of lepidolite is shown to be a variety of muscovite.—Mr. G. F. Herbert Smith discussed crystals of calaverite from the Cripple Creek District, Colorado. They are triclinic, but pseudo-monoclinic owing to twinning about an axis parallel to the edge of the prism zone. The two individuals are interpenetrant with no apparent plane of separation. The crystals are also twinned in the ordinary way. Quantitative analyses made by Mr. G. T. Prior show that the material is nearly pure telluride of gold, AuTe₂, with only about 1 per cent. of silver.—Mr. W. Barlow exhibited models to show arrangements for the chemical atoms of crystals in harmony with the symmetry. The models are composed of closely-packed india-rubber balls of various sizes, each ball representing a single atom. Boracite, boric acid and cassiterite were dealt with. The structure assigned to boracite suggests an explanation of the peculiar dimorphism of this substance discovered by Mallard, and that representing cassiterite shows the twinning of this mineral.

Entomological Society, March 20.—Mr. G. H. Verrall, vice-president, in the chair.—Mr. C. J. Watkins sent for exhibition a series of larch twigs illustrating the winter condition of *Coleophora laricella*, the special feature being the manner in which the cases of the larvæ assimilated in colour with the bark of the larch.—Mr. G. B. Routledge exhibited a specimen of *Hydrilla palustris* taken on the wing by Mr. J. E. Thwaytes near Carlisle in 1899—the first male taken in that district. He also exhibited specimens of *Bembidium schuppeli*, a rare beetle captured on the banks of the river Irthing.—Mr. R. McLachlan exhibited Trichopterous larva-cases of the form known as “*Helicopsyche*” from the Prony River, New Caledonia, sent to him by Mr. J. J. Walker, R.N. They were large and remarkable for the size of the individual sand-grains of which they were built up. These sand-grains, Mr. Walker informs him, were water-worn particles of the heavier minerals of the river bed, such as chrome, nickel and iron ores. It is possible that similar cases were alluded to by Hagen in the *Stett. Entom. Zeitung*, 1864, p. 129, from the Munich Museum.—Mr. G. T. Porritt exhibited specimens of an almost black form of *Acronycta menyanthidis* from Skipwith Common, near Selby, and, for comparison, specimens from the moors near Huddersfield. The chief interest in the exhibit consisted in the fact that in both the districts where the melanistic *menyanthidis* occurred, melanism was not a common feature: whereas in the Huddersfield district, where only the pale form of *menyanthidis* was taken, melanism was a conspicuous feature in many species, even in, and close to, the grounds, where only pale *menyanthidis* could be found.—Mr. H. W. Andrews exhibited a female specimen of *Amphidasys betularia*, with hind wings aborted and scarcely developed, taken at Paul's Cray, Kent, in May, 1896.—In connection with an announcement that the County Council had under consideration the feasibility of stocking the London parks with butterflies, Mr. H. Rowland-Brown stated that according to the

latest observations thirty-nine species of *Rhopalocera* were recorded within, roughly speaking, a ten mile metropolitan limit, but that of these he only knew of *Pieris rapae*, *P. napi*, *Vanessa atalanta*, *V. urticae*, and perhaps one or two others which could strictly speaking be said to inhabit the metropolis itself. Mr. A. J. Chitty said that *Pieris brassicae* had occurred, and that he thought *Vanessa polychloros* might be added to the list of those open to experiment. Mr. G. H. Verrall advocated the introduction of tropical and other foreign species in the great conservatories of Kew, where, without danger to the plants, they would be objects of great beauty and attractiveness, and Mr. Merrifield, while recognising the difficulties arising from soil, climate and surroundings, expressed his belief that certain hardy species would successfully resist their bird enemies.

Royal Microscopical Society, March 20.—Mr. A. D. Michael, vice-president, in the chair.—Messrs. Staley and Co. sent for exhibition a Bausch and Lomb Camera Lucida. It was described in the *Journal* of the Society last December, and is intended for reproducing an object diagrammatically, natural size.—Mr. E. M. Nelson read a paper on the working aperture of objectives for the microscope, in which he showed that in recording delicate observations it was advisable to state the precise ratio of the utilised diameter of the objective to the full available aperture. He then proceeded to explain the different methods by which this ratio, which he termed the working ratio, or W.R., could be measured. Dr. Tatham confirmed Mr. Nelson's views in regard to the necessity for recording the working aperture of objectives, and expressed his appreciation of the value of the methods proposed by the author for obtaining this measurement.—A paper, by Mr. H. G. Madan, on a method of increasing the stability of quinidine as a mounting material, was read by Mr. Nelson in the absence of the author. Mr. Madan found that by keeping quinidine heated to a certain temperature for a considerable time it was converted into colloid quinidine, which condition it had retained for a year; but whether the tendency to revert to the crystalline form was entirely overcome, time alone could show. Mr. Karop said of all media, quinidine, on the whole, was the best yet discovered for mounting diatoms, but it was very troublesome on account of its tendency to crystallisation. He hoped the material prepared as suggested by Mr. Madan would be marketed.—Mr. Rousselet read a paper on some of the rotifers of Natal, by Hon. Thos. Kirkman, illustrated by mounted specimens shown under microscopes. Mr. Rousselet had appended a technical description of *Pterodina trilobata*, one of the rotifers mentioned in the paper, a mounted one of which was among those exhibited; an excellent drawing of this rotifer, by Mr. Dixon-Nuttall, was also shown.—Mr. W. H. Merrett read a paper on the metallography of iron and steel, demonstrating the subject by the exhibition of a large number of lantern-slides of sections of different classes of these metals under various conditions of hardness, stress, &c. The methods by which these sections had been prepared and polished were also explained.

Royal Meteorological Society, March 20.—Mr. W. H. Dines, president, in the chair.—Dr. Hugh Robert Mill delivered a lantern lecture on climate and the effects of climate. He remarked that climatology is as much a branch of geography as of meteorology, in fact more, for it not only deals with the distribution of atmospheric conditions over the earth's surface, which is a geographical question in itself, but all the varieties of climate that give individuality to different countries are produced by the disturbing or controlling influence of land forms. After making a few remarks on the principles of scientific photography and also calling attention to spurious photographs, the lecturer proceeded to distinguish between "weather" and "climate." Weather is the condition of the atmosphere at any moment with regard to wind, warmth, cloud, electricity and precipitation; whilst climate may fairly be called the average weather of a place. Dr. Mill then exhibited on the screen a large number of photographs which he had himself taken in many countries, in order to illustrate the peculiarities of climates in which heat, cold, wind and rain respectively predominate, showing how the varying conditions of climate created by the greater land forms are responded to by the various adjustments of minor land-forms and of plants, and how they are taken advantage of by man.

CAMBRIDGE.

Philosophical Society, March 4.—Prof. Macalister, president, in the chair.—The ossification and varieties of the occipital bone, by Prof. Macalister. These deviations from the normal

type, which occur in one out of every four skulls, may be divided into two great groups, (1) those depending on variations in the union of the five elements of the squama, supra-occipital, interparietal right and left and pre-interparietals right and left; (2) the second group consists of the variations due to the development of new centres of ossification in the lambdoid suture.—On the fifth book of Euclid's elements, by Dr. M. J. M. Hill.—Exhibition of Mr. Graham Kerr's method of reconstructing objects from thin sections, by Mr. J. S. Budgett.—Note on the colour vision of the Eskimo, by Mr. W. H. R. Rivers. Ten men and eight women from Labrador were tested with Holmgren's wools and found to have normal colour vision. In naming colours a limited number of terms were used which were extensively modified by suffixes to express differences of shade and tint of colour. The language was exceptional in possessing names for green and blue which were as definite as those for red and yellow, but resembled most other primitive languages in having no word for brown.—Note on the influence of external conditions on the spore-formation of *Acrospira mirabilis* (Berk. and Br.), by Mr. R. H. Biffen. Chlamydospores of this fungus sown on pea extract gave rise to a sterile mycelium; on Klebs' solution and 5 per cent. glucose or cane sugar to numbers of intercalary sporangia; on beer-wort to sporangia and chlamydospores; on chestnut extract to endoconidia and chlamydospores—the former being in the greatest abundance when the extract was most dilute. Sowings of the spore-balls gave very similar results, the chlamydospores being replaced by spore-balls except in the case of beer-wort, where "ascogonia" were formed. Intermediate forms between the loose spiral "ascogonia" and the closely coiled helices of the spore-balls could be raised by transferring the mycelium from chestnut extract to beer-wort. Increasing the rate of transpiration caused the chlamydospores to become smooth and thick-walled, while diminishing it caused them to become smooth and thin-walled, instead of being rather thick and warted. The envelope of the spore-balls instead of being a single layer became several layers thick on checking the rate of transpiration.—On a reserve carbohydrate, which produces mannose, from the bulb of *Lilium*, by Mr. J. Parkin. Besides starch, the bulbs of several species of the genus *Lilium* examined contain another reserve-carbohydrate which exists as a sort of mucilage in the cell-sap. The sugar obtained from it by hydrolysis with weak acid is mannose.—Notes on new and interesting plants from the Malay Peninsula, by Mr. R. H. Yapp. The only partially explored mountain ranges of this region possess a very rich flora, unaffected by the presence of introduced species such as form a marked feature of the vegetation of the inhabited districts of the plains. A number of the specimens exhibited (which were chiefly collected on one of these mountains) are probably new, and belong to various natural orders, chiefly among the gamopetalous Dicotyledons. An interesting and little known fact is the storage of large quantities of naturally filtered water in the hollow internodes of several species of bamboo. The paper concluded with a brief account of two curious epiphytic ferns, whose fleshy stems are tunnelled by galleries inhabited by ants; forming, in fact, living ants' nests.—The prevention of malaria, by Dr. J. W. W. Stephens. This paper, after a brief historical account of the discovery and the investigation of the malarial parasite, described the researches of Dr. Christophers and the author on the disease in several localities on the west coast of Africa. The result of the work there done leaves no doubt that malaria is avoidable under the conditions of life in West Africa.—On the effects of a magnetic field on the resistance of thin metallic films, by J. Patterson. A. C. Longden, in the *Physical Review*, xi, 2, 40, described a method of making standard high resistances from thin films of metals deposited on glass by means of the kathode discharge. He has shown that the resistance of these films is much greater than that calculated from the ordinary specific resistance of the metal. The author has made experiments to determine what effect a magnetic field would have on the resistance of a film deposited in this manner from a bismuth kathode. The results obtained show that the change of resistance in the magnetic field is entirely different from that of ordinary bismuth. A film of cobalt 1.4×1.3 cm. with a resistance of 682.2 ohms was made, but no change in a field of 27,500 lines could be detected.—On the theory of electric conduction through thin metallic films, by Prof. J. J. Thomson. The author applies the theory, developed by him in a report to the International Congress of Physics at Paris in 1900, to the case of electric conduction through thin metallic films. He shows that when the thickness of the film

becomes comparable with the mean free path of the negatively electrified corpuscles, which on that theory are supposed to carry the electric current, the specific resistance of the substance forming the film will increase, and how it is possible from measurements of this increase to approximate to the mean free path of the corpuscles. It is also shown that the effect of a magnetic field on the resistance decreases with the thickness of the film.

PARIS.

Academy of Sciences, March 25.—M. Fouqué in the chair.—On the Egyptian metals. The presence of platinum among the characters of a hieroglyphic inscription, by M. Berthelot. A metallic box, covered with inscriptions, and dating from about 700 B.C., had a portion of one of its characters made of an alloy of platinum. The specimen was too small for a complete analysis, but from its behaviour towards aqua regia it appeared to be a native platinum, possibly obtained from the alluvial deposits of Nubia or the upper regions of the Nile valley.—On the electrochemical relations of the allotropic states of metals, especially of silver, by M. Berthelot. The thermochemical behaviour of the different allotropic modifications of silver rendered it probable that a definite electromotive force could be observed in a cell containing the metal in two different states as electrodes. On experiment, this was found to be the case, the direction of the current agreeing with the thermal sign of the heats of transformation.—On secondary radio-activity, by M. Henri Becquerel. The radiation from a radium salt consists of three parts, the first, very easily absorbed, and capable of being deviated by a magnetic field; the second, similar in its nature to the cathode rays; and the third, very penetrating, but not capable of deviation by a magnet. Experiments are described showing the differences in the power of exciting secondary radiation possessed by these three classes of rays.—The origin of thermal sulphurous waters. Sulphosilicates and oxysulphides derived from natural silicates, by M. Armand Gautier. An experimental study of the mode of production of sulphurous waters. Granite and other igneous rocks, when finely powdered and treated with water at 250°–300° C. give a liquid identical in character with ordinary thermo-sulphurous waters, although of greater concentration.—On some new derivatives of dimethylamido-benzoylbenzoic acid, by MM. A. Haller and A. Guyot.—A correction of a preceding communication by M. de Jonquieres.—On a formula of M. Fredholm, by M. G. Mittag-Leffler.—M. Sabatier was elected a correspondent for the Section of Chemistry in the place of M. Haller, named a member of the Academy, and Mr. Davidson a correspondent for the Section of Geography and Navigation, in the place of the late M. A. David.—On the general expression of the rational fraction approximating to $(1+x)^m$, by M. H. Padé.—On the formation of nodal lines of sand or dust, by M. C. Maltézos. A suggestion as to the cause of formation of small sandy hillocks on the sea shore.—The specific heat of a gaseous mixture of bodies in chemical equilibrium, by M. A. Ponsot.—The theory of the Wimshurst machine without sectors, by M. Bordier.—On the measurement of the period of the waves used in wireless telegraphy, by M. C. Tissot. The period of the oscillator was measured by the method devised by Feddersen and improved by Décombe. The periods measured were between 0.6×10^{-6} and 1.8×10^{-6} .—The Ritchie telautograph, by M. Brauer. This apparatus transmits handwriting continuously without the use of clockwork.—On induced radio-activity and gases rendered active by radium, by MM. P. Curie and A. Debierne. It has been shown in a previous communication that the radio-activity induced by radium salts is effected through the intervening air. It is now found that the nature and the pressure of the gas are without effect upon the phenomenon, but that if a high vacuum is kept up the second body is not affected. On leaving the apparatus for some time, the secondary radio-activity is again observed, and if the gases evolved are again pumped off they are found to be extremely active in spite of their small mass. Their activity is so great that the glass tube containing them becomes fluorescent, and is visible in the dark.—The direct production of X-rays in air, by M. A. Nodon. Under the simultaneous action of ultra violet rays and an electric field X-rays may be produced without the use of a Crookes' tube.—A method for determining atomic weights founded upon the law of transparency of matter for the X-rays, and the application of this to the atomic weight of indium, by M. L. Benoist. The action of hydrogen upon realgar and the inverse reaction. The influence of pressure and

temperature, by M. H. Pelabon.—The heat of formation of acetals compared with that of isomeric compounds; by M. Marcel Delépine.—On the acidimetric value of the monosubstituted benzoic acids, by M. G. Massol.—The passage from anisole to anisic acid by five successive oxidations, by M. J. Bougault.—On the law of the auxochromes, by M. P. Lemoult.—On naphthylol-naphthyl-oxynaphthylmethane, by M. R. Fosse.—The action of zinc upon the dibromide and diiodide of tetramethylene, by M. l'abbé J. Hamonet. On certain causes of variation in the quantity of gluten in wheat, by MM. Léo Vignon and F. Couturier.—Nervous conduction and muscular conduction of electrical stimuli, by M. Aug. Charpentier.—The variation of visual acuteness with lighting and adaptation; measurement of the migration of the pigment of the retina, by M. Andre Broca.—Curves of thermometric ascent, by M. S. Leduc.—On a parasite observed in the syphilitic, by M. H. Stassano.—On *Schistocerca americana*, its migration and area of geographical distribution, by M. J. Künckel d'Herculais.—The effects of lightning and "gélivure" upon trees, by MM. L. Ravaz and A. Bonnet. By an experimental study of the effects of electricity in motion upon the vine, the conclusion is drawn that the supposed disease of the vine known as "gélivure," and to which a microbial origin has been ascribed, is in reality due to the effects of lightning.—On the age of teschenite, by M. P. Choffat.

DIARY OF SOCIETIES.

THURSDAY, APRIL 4.

LINNEAN SOCIETY, at 8.—On some British Freshwater Rhizopods and Heliozoa: G. S. West.

THURSDAY, APRIL 11.

MATHEMATICAL SOCIETY, at 5.30.—Summation of the Series

$$\sum_{n=0}^{\infty} \frac{\Gamma^2(a+n)}{\Gamma^2(a+n)}$$

: D. F. Morley.

CONTENTS.

PAGE

Space, Atoms, Molecules and the Ether	By G. H. B.	533
Alleged Hypostomial Eyes in the Trilobites.	By G. B. H.	535
The Relations of the Ostrich-like Birds.	By R. L.	536
Our Book Shelf:—		
Phipson: "Researches on the Past and Present History of the Earth's Atmosphere"		537
Seward: "Catalogue of the Mesozoic Plants in the Department of Geology, British Museum (Natural History). The Jurassic Flora. I. The Yorkshire Coast"		537
Parr: "Practical Electrical Testing in Physics and Electrical Engineering"		538
Letters to the Editor:—		
Audibility of the Sound of Firing on February 1. (With Diagrams.)—Robt. B. Hayward, F.R.S.		538
The New Star in Perseus.—C. Easton		540
Nova Persei		540
The Beer Poisoning Epidemic		541
Musical Arcs		542
Little's Expedition to Omi and the Tibetan Border. (Illustrated.)		543
Prof. Josef von Fodor. By W. H. C.		544
Notes		544
Our Astronomical Column:—		
Rutherford Measures of Pleiades		548
Catalogue of Southern Variable Stars		548
On a Solar Calorimeter depending on the Rate of Generation of Steam. (Illustrated.) By J. Y. Buchanan, F.R.S.		548
The Mining Statistics of the World. By Bennett H. Brough		551
The Mineral Constituents of Dust and Soot from various Sources. By Prof. W. N. Hartley, F.R.S., and Hugh Ramage		552
Studies in Visual Sensation. By Prof. C. Lloyd Morgan, F.R.S.		552
University and Educational Intelligence		553
Societies and Academies		554
Diary of Societies		556